

DIRECTIONS FOR OPERATING THE

Universal Type-Maker

(NUERNBERGER-RETTIG)

[With Illustrated Parts List]



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Universal Type-Making Machine Co.

321-323 NORTH SHELDON STREET

CHICAGO, ILL.

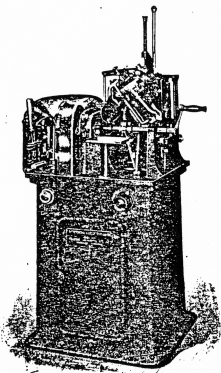
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THE UNIVERSAL TYPE-MAKER
(NUERNBERGER-RETTIG)

DIRECTIONS FOR OPERATING THE

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PREFACE

THE following pages include careful directions for the operation of the Universal (Nuernberger-Rettig) Type-Maker. They have been written by the inventors of the machine, and are intended to give concisely such details as are requisite to its successful operation.

It is desirable that not only the operator of the machine familiarizes himself with these directions, but that several others in the plant in which the Universal is installed are made familiar with them, so that there need be no difficulty in securing a good product.

The makers are always glad to answer any queries, but it is suggested that before inquiries are sent into the office these instructions be carefully scanned, to note if the difficulty, if any, has not already been discussed and the remedy provided.

Universal Type-Maker

DIRECTIONS FOR OPERATING THE MACHINE

The Machine and Its Placing

1. The Universal Type-Maker occupies a floor-space of twenty-five by twenty-seven inches; is five feet high from the floor to the top of the Pump Plunger Stem (19); the table is thirty-two inches above the floor. When equipped with motor, controller and driving-gear installed in base complete, the weight is nine hundred and fifty pounds. Belt-drive, instead of motor, will be furnished when desired. All parts of the machine are easily accessible.

2. Whenever possible, the Type-Maker should be placed near a window, in such position that the operator when facing the machine will have his left side toward the window. The front line of the caster should be a little back of the middle of the window. In this position the light will fall from the left into the mold and upon the Nipple (69) when the mold is open, and gives the operator the benefit of ventilation when a window is open, without the draft blowing out the gas under the metal pot.

Gas-Burner and Connections

3. The Gas-burner (304) for heating the metal is so constructed that the flame will spread (315), thus heating the metal evenly with a minimum amount of gas; the flame should be blue. If it is red, it will deposit soot on the bottom of the Melting Pot (1), which prevents the metal from becoming properly heated. The air-supply regulator on the lower end of the air-mixer can be turned to the right or left, to open or close the holes through which air passes into the mixer. Too much air will cause the gas to ignite in the mixing-chamber; if that occurs, the gas must be turned off and the air-holes closed up a little more before again lighting the gas. When the flame is blue, it generates the most heat; once adjusted, the burner (304) requires no further attention, unless the gas-pressure should vary greatly.

4. A good supply of gas is essential. Nothing smaller than a three-eighths-inch gas-pipe should be used to supply the burner, and the gas-cock should be large enough to allow a good flow of gas through same to the burner. After the metal is melted, the



gas can be turned down so the metal will be kept at an even temperature.

Electric Connections

5. The motor and controller are installed in the base of the machine, and the necessary wiring is also in the iron conduits in the base; the ends of the wires project through a hole in base at the back of machine. In making electrical connections, a standard knife switch with cut-out for "no-arc" fuses should be placed on the wall near the caster, so the current can be cut off from the machine whenever it is not in use. The local underwriters' or insurance rules for wiring should always be observed in making connections.

Water Connections

6. The Mold Block (294) to which the molds are fastened is water-cooled. This arrangement is much better than running water through the mold itself, as by such method the temperature of the mold can be better regulated without the sudden changes of temperature to the casting surfaces that result when water flows through a mold close to the casting chamber.

7. The water-supply pipe need be no larger than quarter-inch iron pipe. The end of the pipe should be located about two feet and eight inches above the cap of Cam-shaft (131) bearing nearest the Crank (224), and the end of pipe should be provided with a good lever-handle stop-cock that will not leak. A piece of rubber tubing connects the water-tube in Upper Mold Block (10) with the stop-cock. When arranged as above, the Rocking Plate (7) will move to and from the Nipple Plate (71), and the mold can be opened without the rubber tubing becoming entangled with any part of the Mold Block (10), provided the tubing is of proper length.

8. The waste-water pipe should not be less than three-quarters-inch iron pipe, and so arranged that the top of the pipe can be seen from the front of machine by the operator. The top of the waste-pipe should, when possible, be about one foot above the floor, and plenty of fall given to the pipe so water will run off readily. If, however, it is not possible to arrange the waste-pipe in this



manner, it may be fastened to the wall, with end of pipe several feet above the floor, and the end of the rubber tubing, through which the water flows after passing through the Mold Block (10), should be fastened above the end of the pipe in such a way that the operator can at all times see the amount of water passing through the machine, without leaving his position in front of the caster.

Cleanliness

9. It is important to keep the machine clean at all times. A good workman is usually particular that the tools he uses are clean and in good order. A machine with which it is expected to turn out work as accurate as type must necessarily be cannot give perfect satisfaction unless proper attention be given to keeping it clean. The production of a maximum output of accurate type with sharp faces will repay the operator for the fifteen or twenty minutes that should be spent every morning in cleaning and oiling the machine. It should be remembered that the mold and other parts concerned in contact with the type product are finished to the ten-thousandth part of an inch. Grime or dust or grit interferes considerably with the nice adjustment and complete accuracy of which the Universal Type-Maker is capable.

Oiling

10. Use a good grade of lubricating oil, and be sure to get the oil into the bearings. Oil on the outside of the machine does no good. It only collects dust and dirt, and is an indication of a careless operator. Be sure the oil flows freely into the oil-holes and bearings, and, after oiling, wipe off all oil that may run out of them.

11. Oil should not be used on any part of the melting pot, as it will burn off and cause the Plunger Stem (19), Plunger Arm (22A), and Choker Arm (15A) to stick. For lubricating these parts, take one part mutton tallow and one part fine graphite; heat the mutton tallow and mix the graphite with it; when cold, a small amount of this mixture used daily on the plunger stem at the bushing, on the choker arm stud, and the Pump Plunger Arm (22A) at the fulcrum (4), will keep these parts in good working order.



Temperature of Metal

12. A suitable thermometer should be used on each machine. The temperature at which the metal is to be run depends on the grade of metal used. If old type-foundry metal is to be used, the temperature should be about 725° Fahrenheit; good type metal, purchased from a first-class metal maker, should be run at about the same temperature, 725°. If a softer grade of metal be used, the temperature should be lower. A good rule is to run the metal at the lowest temperature possible to get good sharp faces and solid bodies. The operator must be careful not to overheat the metal, as that burns out the tin, separates the antimony from the other metals of which good type metal is composed, and therefore destroys its flowing and wearing qualities. It is of the first importance, and an essential to successful results, to use the metal at the proper temperature, and not to damage it by overheating. A product of rough or uneven type at once indicates improper handling of the metal, or a poor or unsuitable quality of metal.

Handling the Metal

13. All old type or metal should be remelted in a large kettle or melting pot. Be careful not to get any least scrap of zinc mixed with your metal, as in addition to destroying metal it will ruin the Pump Plunger (19) and Choker (70). Look out particularly for parts of old zinc line engravings, and do not attempt to use shavings from finishing tools where zinc is worked. After metal is melted, and before dipping it out of the kettle, it must be cleaned. To do this, throw a piece of tallow into the molten metal and stir well; then skim off the dross, which should be in the form of a fine black powder.

14. The metal is now ready to be dipped out. In dipping out, keep metal constantly stirred, and always dip from bottom of the pot up; pour into Metal Pan (S-5), such as is furnished with each machine. The cakes or ingots cast in this pan are of about the right size.

15. The metal in the melting pot of the caster should be cleaned once every day or two. Throw a piece of tallow about as large as a small walnut into the molten metal and stir



thoroughly. This will wash all the metal out of the dross; then skim off the dross. This treatment improves the metal.

16. After metal has been cast into type several times, it is apt to become brittle or soft—brittle if the tin is burned out; soft if the tin and antimony are both reduced. Tin should then be added when remelting. If tin and antimony are not at hand, a liberal quantity of new type metal added to the old metal will greatly improve it. It is often possible to arrange with a metal-supply company to renew metal at a cost of about one cent per pound.

Composition of Metal

17. A very good type metal is made according to the following formula: Lead, 56 pounds; tin, $18\frac{1}{2}$ pounds; antimony, 25 pounds; copper, $\frac{1}{2}$ -pound. Total, 100 pounds. Although the percentage of copper is small, it toughens the metal and increases its wearing qualities. If facilities for melting and properly mixing copper with the other metals are not at hand, it may be omitted.

18. New metal should be purchased of a reliable concern understanding fully what good type metal is. That equal to the best used by the type-founders is what is desired, not the much softer metals required by casters not equipped with the efficient furnace and pump characterizing the Universal Type-Maker.

Pump Plunger

19. Solid type with sharp faces cannot be cast unless the pump plunger works freely up and down without leaking. Should it get stuck at any time, it must be taken out and cleaned.

20. To remove pump plunger, take out small pin (34) attached to Plunger Arm (22A) by chain; press down on Plunger Stem (19) sufficient to relieve pressure of arm from plunger-stem spool; pull out arm so end is free from spool; then raise pump up until plunger-stem bushing is lifted out of plunger-stem guide, and pull forward so stem passes through slot in guide.

21. To clean, dip pump while hot into a can containing rendered mutton tallow, then wipe clean and put back into metal pot. If it still sticks, take it out and, after dipping once more into mutton tallow, put back again into well and work the plunger



up and down until perfectly free; now clean off pump with a clean cloth and place in working position.

22. In putting plunger into well, be careful that it is as hot as the metal. It should be held in the molten metal a few minutes, until the end that works in the well is of the same temperature as the metal; then placed into the well, and the plunger arm put into its working position.

23. A good rule is to take the pump out of the Melting Pot (1) every morning and clean it before beginning to cast type. A leaky plunger should be replaced with a new one.

Instructions for Grinding Pump Plunger into Well of Melting Pot

24. Dip all metal out of the Melting Pot (1), and also out of the well; it is advisable to take the melting pot off the machine entirely so as to pour out every particle of metal that is in the well. Then wipe out the collar of the well as clean as possible and let the pot cool off, as it must be perfectly cold when the Plunger (19) is ground in. Hold the pot in a vise, put the Plunger Stem Sleeve (29) over the stem so you will have a perfect guide in order to grind the plunger true; fasten a lathe dog to the extreme end of the Plunger Stem (19). You are now ready to grind in the pump-plunger.

25. Use plenty of thin oil (machine oil will do) and a small amount of fine flour of emery. With the oil and emery spread evenly on the plunger, insert the plunger in the well and keep turning it to the right only, using great care that the plunger does not become dry while you are grinding it in, otherwise it may become stuck so tight you cannot pull it out. In other words, you must continually add oil and emery so that the collar of the well and plunger are always well lubricated; being careful to often pull the plunger clear out of the collar to see that there is plenty of oil and emery on same.

26. When the grinding is nearly completed,—that is to say, when the plunger begins to go all the way through the collar, even though it still seems to fit a little tight, wipe all emery and oil off and finish working the pump in the collar with oil only until it works freely in and out. Before putting the pot back on



the machine be sure that every bit of emery has been wiped out of the well, as any emery in the well, when the machine is running, will adhere to the plunger and soon wear it down below size.

27. Put the pot back on the machine; throw in plenty of metal, but do not insert the plunger until after the metal is melted, and be careful not to put the plunger into the well until you have held the plunger end in the molten metal until it becomes of the same temperature that the pot happens to be; and then insert Plunger (19) very carefully into the well to see that it does not fit too tight.

Pump Plunger Pressure

28. Inside the base of machine, about ten inches from the front door (77), is a knob (78), of the same shape and size as the knob on door. This knob is fastened to the Plunger Spring Rod (219), and is for the purpose of increasing or decreasing the tension of the Plunger Pressure Spring (215). In casting small type, say from five points to ten or twelve points, very little pressure is necessary; but when large sizes are being cast, and the faces are not sharp, it may be necessary to increase the tension on spring. By turning the knob to the right, the spring is tightened and the pressure increased; by turning it to the left, the pressure is reduced. If just enough pressure is used to cast good faces and bodies, the machine works best. A little study and practice will enable the intelligent operator to make the proper adjustment and get the best results.

Choker

29. The Choker (70) is adjusted by two screws (302) passing through the upper end of the Choker Lever (14), one on each side of the Choker Arm (15A).

X — 30. Should the choker need adjusting, proceed as follows: Have mold and matrix in casting position against the Nipple (69); then loosen the lock-nuts (205) on Choker Lever Screws (302); next loosen screws sufficiently so Choker Arm (15A) on metal pot can be moved back and forth about one-eighth of an inch; now slowly tighten screw on back or further side of Choker Lever



(14), until the choker is pressed firmly against choker seat in the melting pot. Then step in front of machine and adjust forward Choker Lever Screw (302) so there is about one thirty-second of an inch space left between the end of this screw and the front side of choker arm. If these adjustments are correctly made and choker still leaks, it will be necessary to take out nipple and choker, and turn off the choker smooth and clean at the seat. This should be done in a lathe. — X

Removing Nipple and Choker

The nipple and choker can be taken out of metal pot only while the metal is in molten state. To do this, proceed as follows:

31. Remove the mold and Nipple Plate (71), also take off the Matrix Bracket (182) by taking out both screws (261) that pass through Matrix Bracket (182) into Mold Block (294); pull entire bracket toward you by taking hold of Matrix Rod and Spring (159 and 169); (this bracket is easily replaced, as two taper pins bring it into proper position).

32. Dip enough metal out of the melting pot so that the surface of metal remaining will be below the lower edge of nipple hole in pot; in other words, dip out enough metal so none will run out of pot when nipple and choker are removed.

33. Now, with the nipple wrench, turn the Nipple (69) back and forth until the Choker (70) gradually forces the nipple out of the pot. Should it be found to stick rather tight, a little oil put on nipple close to the pot will help loosen same. The nipple is not screwed into the pot, but is a drive fit.

34. When nipple is out, put a little oil inside same and throw it into the molten metal still remaining in the pot.

35. Now, with the right hand, push a screw-driver between the Choker Lever Cam (47) and roller, and, by moving it down and up, work the Choker Arm (15A) on top of pot back and forth. With the left hand, place end of large screw-driver between the top of metal pot and choker arm, and, while moving the right hand down and up, pry the choker arm up with the screw-driver in left hand until the Choker Pin (73), running through choker arm into hole in choker in pot, is out of the hole. The choker can now be taken out of the pot.



36. Put a little oil on choker and throw it into the molten metal also; it will float and can easily be taken out. Cut a thin piece of wood so the edges are about the shape of the inside of the nipple; take nipple out of pot, and, while still hot, insert the piece of wood and turn back and forth, to clean out all metal and dirt in the same; also clean nipple well on outside, especially the part that fits into the hole in metal pot.

37. Next, take choker out of molten metal, and, with an old brush or swab, clean off all metal. Especially clean carefully the choker point and seat.

Replacing Nipple and Choker

38. Put Choker (70) into position by holding it with a pair of pliers. Do not put pliers on choker point, as it will damage the part ground into nipple, but hold it about half an inch back from the point; move choker back and forth a few times with pliers to make sure it is perfectly free in the bearings in pot.

39. Put a little white or red lead mixed with oil around that portion of the Nipple (69) where it fits into the metal pot. Place nipple in hole; immediately drive it into position by placing the nipple driver against the shoulder or rim of the nipple, driving it home with a hammer. The nipple must be put in while the pot is hot and the nipple is cold. The nipple expands quickly when once in position, making a tight joint; therefore, it must be driven into position quickly, before it becomes as hot as the metal pot.

40. Now put the Choker Arm (15A) back before filling the pot with metal, so as to be sure the Choker Pin (73) fits properly into the choker hole.

41. If the nipple leaks at the point, it is apt to cause squirts between the nipple and Nipple Plate (71). To remedy this, take out the nipple, as explained in the preceding section under the caption, "Removing Nipple and Choker;" clean both nipple and choker, and, when both are cold, grind the point of choker point into nipple point with a little oil and flour of emery; use the nipple-grinding device furnished with each machine for that purpose.

42. Always be sure to use the small choker for small nipple and large choker for large nipple only.



43 When nipple or choker needs repairing, send both nipple and choker, as we cannot properly repair one without the other.

Nipple Plate

44. The nipple plate is adjusted so the slotted ends will have about one sixty-fourth of an inch clearance on the pins, when the plate is pressed squarely and firmly against the nipple point. Sometimes the pins on which the plate is hung may be slightly bent, making it necessary to readjust the plate. This is done in the following manner:

45. Put nipple plate in position; throw back upper half of mold, turn Crank (224) forward, bringing it into horizontal position, thus pressing the lower half of the mold firmly against the Nipple Plate (71), which also holds plate squarely in position. Now press down and up on end of plate with screw-driver, to ascertain if there is any clearance between the pins and the slots in ends of plate. If the plate binds on one or both pins, file out the slots in plate sufficiently to give the necessary play (only just enough to allow the plate to be moved freely—about one sixty-fourth of an inch at each end), while center of plate is held firmly against the nipple. Too much clearance is dangerous, as it will damage the nipple point.

Sizes of Nipple and Plate for Various Sizes of Type

46. The Small Nipple (69), Choker (70) and Plate (71) are to be used for casting type from five- to fourteen-point; for larger bodies, the large nipple, choker and plate should be used. Always be sure to use the proper size choker with each nipple, and never use a nipple plate with hole smaller than hole in nipple.

47. The hole in nipple plate is tapered, the large end of hole being toward the mold, so that the sprue will pull out easily after the type has been cast. In case the sprue sticks in plate, the hole should be reamed out with the plate-reamer which is furnished with each machine. This must be done carefully, so as to leave a hole perfectly smooth, and be sure to ream out hole so that large end is toward mold when plate is in its casting position.



48. A nipple plate with extra-large hole is also furnished. This can be used on any size nipple, and will be found very useful when very wide type are being cast. In this plate the hole has been enlarged by milling it out so the counterbored portion will cast a large overhanging sprue on the lower side of the jet, for the purpose of holding jet firmly in lower half of mold while the mold opens and breaks off jet from type. This plate should not be used when casting thin characters, as the sprue is likely to melt off when machine is running at high speed, in which case the Ejector (98) would fail to discharge the jet from the mold.

Opening Arm

49. When casting type, the mold is opened and closed by the Opening Arm (104), the finger of which is held in the upper mold block slot by the latch (59); the lower end of this arm is fastened to the Snake (67) by a swivel joint (105). This opening arm should be adjusted so the finger will press firmly down on upper mold block when the mold is in its casting position. If it is too loose, it may cause a fin or burr on the type body; may even prevent the mold from closing tightly.

50. To adjust Opening Arm (104), have the mold and matrix in position; turn Cam-shaft Crank (224) down by hand, so the mold is against nipple in casting position; press back opening arm latch and draw the opening arm out of mold block slot, to try adjustment. If properly adjusted, the finger of arm should bear on bottom of slot just enough to enable the operator to pull same out and replace it without much force; that is to say, the operator should be able to move the arm out of and into the slot by using a little pressure. There must be no lost motion to the opening-arm finger in the upper mold block slot when the mold is in its casting position.

51. If the arm is too loose, it must be tightened. Loosen the nut on rod that connects the snake with the ball-socket joint (92) on table of machine. Then turn the ball-socket end of rod to the right until pressure of arm finger in slot is correct; tighten the lock-nut, to hold Ball-Socket Connecting Rod (91) in position. If the arm is too tight, it must be loosened by turning ball-socket end of rod to the left.



Locking Post

52. The Locking Post (193) is at the left side of the Rocking Plate (7), and is actuated by the Locking Post Cam (49) through the Locking Post Lever (11). A seven-sixteenths inch screw (194) passes through the bent end of the locking post, being locked in position by a lock-nut (195). This screw stands at an angle of about thirty-nine degrees with the vertical portion of the locking post, and at right angles with the upper surface of the upper mold block when machine is in its casting position. Its object is to securely lock the mold while the molten metal is being forced into the mold cavity.

53. It is of the utmost importance that the pressure of the Locking Post Screw (194) on the end of mold block be exactly right. If there is not enough pressure, the type will be cast with a fin. If there is too much pressure, a fin will also be cast on type, because too much pressure will spring or bend the upper mold block, so the contact surfaces of the mold at the mold cavity will not be tight enough.

54. To adjust, turn the Crank (224) of cam shaft down by hand until mold and matrix are in their casting position against the Nipple Plate (71). Loosen the lock-nuts (195) on locking post screw, and with the small screw-driver loosen said screw so as to relieve all pressure. Then, holding the screw-driver between the thumb and first two fingers only, tighten the screw just enough to hold the mold firmly together; be sure it is not too tight, or you cannot cast smooth type.

55. The above adjustment need not be made unless a burr or fin appears on the type, due to some accident that may strain the locking post, or if the rocking plate has been shifted; or to take up wear on the screw point on Mold Block. As the screw, as well as the steel piece set into Upper Mold Block (10) on which screw presses, are hardened, the wear is very slight. In some cases, the caster has been in daily use for six or eight months without any adjustment of the locking post screw being necessary.

56. The vertical portion of the locking post passes through a spiral spring (211), on top of which is a collar (57) with set-screw to hold said collar tightly to post on top of the spiral spring. The tension of this spring must be sufficient to keep the



Locking Post Lever Roller (21) always tight against the cam on shaft. If it becomes loose, the locking post may drop a little, and cause the upper mold block to strike the locking post screw while the mold is going into its casting position. In that case the locking post lever must be held against the cam while the mold is open and away from the melting pot; the set-screw in collar is loosened, and the collar pressed down on the spring to increase the tension, and the set-screw tightened.

Rocking Plate Withdrawing Lever Spring

57. This spring (85) is located in the scrap box, and can be seen through the opening on the right side of base. It connects the Rocking Plate Withdrawing Lever (88) with the screw hook (86) passing through the back of base, with thumb-nut on outside.

58. In casting small type, this spring should not have too much tension, as it will then cause the machine to run with a jerky motion; but, when large type are being cast and the jet does not break off the type readily, it will be necessary to tighten the thumb-nut, in order to increase the pulling strain on the rocking plate, thus removing the jets from type easily and clean. When changing from large type to small sizes, always loosen tension on this spring (85).

Rocking Plate

The Rocking Plate (7) is that part of machine on which the mold block and mold are mounted. Should it become necessary to remove it in order to make repairs, proceed as follows:

59. First, take out screw (95) that holds upper end of ball-socket rod to Snake (67); then loosen thumb-nut (87) used for tightening Withdrawing Lever Spring (85); this nut is located on the back of base, about eight inches below the gas-burner supply pipe. Now take out both filister head cap screws (89) which hold the Withdrawing Lever (88) to back of rocking plate. To remove these screws, the operator must use a large screw-driver, and, from the back of machine, pass screw-driver through under fire-box and alongside of burner. Next, loosen nut on Rocking Plate Eccentric Shaft Center Screw (41), on right side of



machine below the Cam Shaft (131). By turning this screw to the left, the point will be withdrawn from the Rocking Plate Eccentric Shaft (109), after which the entire Rocking Plate (7), with all its parts, can be lifted out of the machine.

60. To replace rocking plate, put in the Eccentric Shaft Center Screw (41) first and adjust same so there will be no lost motion; then replace filister head cap screws (89) holding Withdrawing Lever (88). Now replace thumb-nut on withdrawing lever spring; and finally fasten upper end of Ball-Socket Rod (91) to the Snake (67).

Matrix Holders

61. Three styles of Matrix Holders (pl. 13) are made: One for holding the regular Nuernberger-Rettig matrix, one for holding Linotype matrices, and one for holding Compositype or similar-shaped matrices. Special holders for other forms of matrices can be furnished to order.

62. The holders carried in stock are so simple that instructions as to replacing matrix in same are unnecessary. The illustrations on another page of this book show just how they are held in position.

63. Before casting type from Linotype or Compositype matrices, the Matrix Lever Adjusting Screw (176) must be properly set. To do this, loosen nut (140) on matrix lever adjusting screw, and turn screw to the left, to partly withdraw same. Now turn Cam Shaft Crank (224) toward you, far enough to bring mold firmly against the Nipple Plate (71). Do not turn crank far enough toward you to bring the Choker Lever Cam (47) in contact with the Choker Lever Roller (21); when crank shaft is in horizontal position, it is about right. Now turn matrix lever adjusting screw to the right (forward) until the end of same comes in contact with the Matrix Lever Stop (179). Be careful not to screw it too tight against the stop, or it will bend the Lever or the stop; but only just tight enough so type will be cast without a burr or fin at the face end. Be sure to tighten the lock-nut (140) on screw after adjustment is made.

64. Whenever changing from one style matrices to another, the above adjustment must always be properly made, in order to insure the delivery of type from the mold with sharp, clean bodies at the face end.



Ejector

65. The Ejector (98) is located on the back of the rocking plate. The Ejector Blade (98) passes back and forth between the mold and nipple Plate while the caster is in operation, and ejects the jet from the mold after same has been broken from the type.

66. The ejector blade should be adjusted so it will pass very close to the mold jet without actually rubbing against it. Adjustment is necessary whenever molds are changed that vary much in body. The jet of the mold for large bodies moves back farther than jet on small-body molds. On space and quad molds the jet does not move at all.

67. Below the matrix bracket and above the snake is a three-eighths-inch hexagon nut (140) that locks the Ejector Blade Adjusting Screw (99). To move the blade toward or from the Mold, proceed as follows: Loosen the hexagon nut, and, with the medium-sized screw-driver, turn the screw to the right, to move ejector blade away from the mold, and to the left to bring it closer. When in proper position, again tighten the hexagon lock-nut.

Stop Motion

68. The stop motion mechanism is located under the Hood (300) on left side of machine and is used when casting large type. It is so arranged that a stop or dwell of the rocking plate occurs when the mold is in its casting position. It is provided with a vertical Shifting Lever (154) with which it can be set so the rocking plate will dwell while the driving pulley on cam shaft makes one, two-and-a-half, or five revolutions on the Cam Shaft (131).

69. In using the stop motion while casting large type, the mold is brought quickly against the Nipple Plate (71), and the metal is forced suddenly into the mold, thus insuring good sharp faces. During the dwell, the pressure of the pump continues on the metal; this makes the type solid and allows the metal to cool in the mold. The type is then discharged by a quick revolution of the cam shaft, and the next type cast, while the rocking plate again stops long enough for the metal to cool in the mold.

70. This stop motion is peculiar to the Universal Type-Maker.



It not only insures sharp faces and solid type, but it increases the output of large type considerably.

71. To change from continuous motion to stop motion, it is only necessary to pull down the Cam Lock Lever (125), which is in a vertical position while continuous motion is used; this lever is located alongside the Starting Lever (119A). When changing from stop motion to continuous motion, raise the cam lock lever from its horizontal position to its vertical position. These changes can be made while the machine is casting type.

72. The Intermittent Cam Shifting Lever (154) is always in an almost vertical position, and is for the purpose of shifting the Intermittent cam so as to provide for a dwell of the rocking plate during one, two-and-a-half, or five revolutions of the cam shaft pulley. If the operator will remove the hood from the stop motion (never lift the hood on or off without stopping the motor) and run the machine with stop motion for a few hours, the mechanism of the stop motion can be studied and thoroughly understood.

Cam Shaft

73. To remove Cam Shaft (131), proceed as follows: Take off all the tension from the pump spring by turning knob (78) inside base to the left, as described under caption, "Pump Plunger Pressure;" throw belt off pulley on main shaft in base. Pull Plunger Arm (22A) out of plunger stem spool as described under caption, "Pump Plunger." (This is precautionary, and prevents danger of getting burned.) Take screws out of Cam Shaft Bearing Caps (16) and remove caps; the cam shaft may now be lifted out of bearings.

74. When putting shaft into position on machine, be sure that the pinion gear on cam shaft is correctly meshed with large gear on secondary shaft. The pinion (328) in Driving Pulley (113) on Cam Shaft (131) has one tooth notched; that is to say, a half-round notch is cut in one of the teeth of the pinion; the large gear (111) on the Secondary Shaft (146) has two teeth notched in a similar manner. In putting the shaft into position, the notched tooth on the small pinion must be placed between the two notched teeth on large gear. In this position, the notched tooth on small pinion will pass between the two notched teeth on large gear at every revolution of the large gear, and the stop motion will work correctly.



Molds

75. To insure accuracy of type bodies, height to paper and set, the molds must be kept clean at all times. Use a soft, clean cloth or brush to clean the mold. Put a little oil on only that portion of the carriages where they come in contact with the registers and guides, and on the jet plates, between the carriages and backplates. The bodies and top of carriages should be cleaned with oil occasionally, then wiped dry and clean, as oil in the mold chamber and on the carriages or bodies collects dirt and prevents the casting of smooth bodies.

76. Before putting mold on machine, the mold block must be free from dirt or specks of metal. A clean brush should be kept for cleaning the mold block and molds of small particles of metal that adhere to either the mold or block. Use the end of a piece of brass rule to scrape them off. (Never try to scrape mold or block with a piece of steel, emery cloth or any abrasive.)

77. To clean metal or dirt from between the jet and carriage of the mold, take out the screw in center of backplate; this is the jet retaining screw and acts as a stop for the jet in its movement away from the carriage when the jet portion is broken from the type. Now slide out the jet and clean all contact surfaces. If particles of metal adhere anywhere, scrape them off with a piece of thin brass rule. Put jet springs and spring caps into proper position; oil all wearing surfaces, and put jet retaining screw in position. Be very careful not to raise a burr on backplate or screw-head in carrying out above instructions, and never use emery in any form on the Mold. It is essential to keep molds clean and smooth.

Matrices

78. Care must be exercised in the use of any make or style of matrix. Carelessness on the part of the operator often destroys the face of a matrix. Never lay down a matrix where anything is apt to be dropped on it, or in any way bruise it. A good face cannot be cast in a damaged matrix.

79. Particles of metal on the face of the mold will bruise the face of the matrix; if bruised, a burr on the edge of the face will prevent type from being freely discharged from the mold. When



done using a set of matrices, always place them in the box in the regular order as received.

80. Never rub matrices on a stone, file, emery cloth, or any abrasive. If metal or dirt is stuck on any place, use a thin piece of brass rule, lead, or slug, and scrape it off. Matrices rubbed on a stone or file will cast type low to paper or thin setwise.

Alignment

81. All Nuernberger-Rettig molds and matrices are adjusted to the standard line adopted by the type foundries. The construction of the molds, matrices and matrix holders is such that the alignment can be changed to match any type, the face of which is other than standard line. This is sometimes desirable in order to align a small body face with a larger one (as, for instance, six-point face on eight- or ten-point body), and is very convenient for special work.

82. To change alignment, proceed as follows: Remove lining stool from mold by taking out screw that passes through stool into the register; then remove stool lining plate. If the face is to be brought up higher on the body (higher line), put a thicker lining plate under stool. If a line is to be lower on the body (lower line), put a thinner plate under stool.

83. Extra lining plates may be made of brass rule. Never change the thickness of the original line plate found on mold, as this is exactly right for standard line, but always make a new plate for special line. Special plates may be saved for future use by putting them in a small envelope, properly marked what they are for, with number and size of mold to which they belong.

Pressure of Mold Against Nipple Plate

84. Although all machines and molds are properly adjusted at the factory before they are shipped, simple means for making adjustments which may become necessary, due to wear of parts, have been provided.

X—85. The pressure of mold against Nipple Plate (71) should be just enough to insure a close joint between the jet lips and groove in jet end of body (not the nicks). If pressure is not sufficient, the type will leave the mold with a burr or fin at the jet end. X



86. To remedy this, take off the mold and clean between carriage and jet as explained in a preceding section under the caption of "Molds." Then again put mold on machine, and throw upper half of mold open, so lower half only will press against the nipple plate. Now turn Cam Shaft Crank (224) toward you, so as to bring crank into a horizontal position. This brings the lower half of mold against the nipple plate and enables operator to judge whether pressure against plate is correct.

87. If not correct, adjust as follows: Loosen nut (140) on screw which passes through frog (12) against Rocking Plate (7); this screw is located below Rocking Plate Cam Roller (21A). To increase pressure, tighten screw; to decrease pressure, loosen it. A very little turn of the screw makes quite a difference in the pressure. When adjustment is correct, lock the screw by tightening the nut on screw against frog.

88. Never make the above adjustment too tight, as there would be danger of battering the nipple point and causing it to leak.

Adjusting Mold Block and Sprue

89. The sprue is that portion of the jet which is cast in the nipple plate. The sprue should be set so part of it will cast overhanging or projecting below the lower side of jet. This holds jet in mold after it is broken from the type until Ejector (98) throws it out of mold into jet chute.

90. To ascertain if sprue is properly set, throw open upper half of mold, so that only the lower half will come in contact with the nipple plate when crank is turned toward you into horizontal position, as described in the preceding section under caption, "Pressure of Mold Against Nipple Plate." When mold is in this position, the lower edge of hole in nipple plate should be a little below the lower edge of the mold jet;—that is to say, about two-thirds of the hole in nipple plate should appear above the edge of the jet chamber and about one-third of the hole project below said edge of jet chamber. If necessary to make this adjustment, proceed as follows:

Loosen the two three-eighths-inch set-screws (301) which are in the lower end of piece 7B; the ends of these screws bear against the Eccentric Shaft (109) and prevent said eccentric shaft from turning in its bearings in the Rocking Plate piece (7B). Now insert



6. a pin wrench into one of the holes that run at right angles through said eccentric shaft and turn same in its bearings until the entire Rocking Plate and Mold Block piece (7B), on which the mold is mounted, is either raised or lowered enough to bring the jet chamber edge into proper position at the hole in nipple plate. Be sure to tighten the set-screws (301) firmly against Eccentric Shaft (109) after adjustment is made. After the above adjustments are made, examine opening arm pressure and locking post pressure as explained under captions, "Opening Arm" and "Locking Post," respectively.

91. In casting wide characters, especially on large bodies, it is advisable to move the mold block toward the right, so as to bring the sprue near the middle (not center) of the setwise portion of jet end.

92. This adjustment is easily made as follows: Loosen the two screws (292A) that pass through the upper surface of lower mold Block (one on each side of lower half of mold), and one screw (292) passing through front of mold block; these three screws hold the block firmly to the rocking plate. Now turn the five-sixteenths-inch screw (291), that has end squared for quarter-inch wrench (this screw projects through yoke between two large square-head screws (351) on extreme right of rocking plate) to the left, thus moving the entire mold block and mold to the right, until the sprue is in proper position.

93. When changing from wide to narrow type, the block must again be moved back to original position, so hole in nipple plate will be in lower corner of lower mold jet.

Burr, or Fin, on Face of Type

94. A burr, or fin, is usually caused by dirt or metal collecting between the face of matrix and face of mold. If that is not the cause, examine matrix and see that no burr or nick appears on the face end. Also try the matrix lever, to see if matrix lever screw is properly set.

95. If dirt or metal be found on either the face end of matrix or face of mold, scrape it off with a piece of thin brass rule, lead or slug. Should there be a burr on the matrix, it may be removed with a very fine cut file or stone. Great care must be exercised,



if this be done, so the surface of matrix is not filed or rubbed down, as this would make the faces in matrix too shallow, and type would be cast low to paper. If Matrix Lever (170) does not press matrix tight against mold face, adjust Matrix Lever Adjusting Screw (176), as explained in one of the following sections, under the caption, "Quotation Quads," where the method of adjusting matrix lever is fully set forth.

Splashes, or Squirts

A great deal could be written as to why any type-casting machine happens to cast a splash or squirt. We mention here some of the causes.

96. A splash may occur, if the metal is too hot; if the mold has not been properly adjusted against the matrix setwise; if there is too much pin out or not enough pin out in upper mold body; if the matrix has been bruised or damaged, causing face of type to stick in the matrix when the mold opens, and being again forced into the mold chamber when it closes; if there is too much oil on the mold surfaces and in the mold chamber; if the nipple point leaks; if the nipple plate is not properly adjusted; if the sprue is set wrong; if the hole in nipple plate used is smaller than hole in nipple; if hole in nipple plate is scratched, rough, or has a burr on the edge; if type is cast at too high a speed; if the Plunger (19) sticks; or the Matrix Rod Spring (169) has not enough tension. The remedy for all these conditions has been given.

97. When a splash occurs in the mold, always remove it very carefully, using nothing harder than brass to drive the splash out. Always drive a splash in the direction from the mold body; that is to say, toward the left when the mold is on the machine.

98. If metal has been forced between the mold carriage and movable jet, the mold must be taken off, and the jet cleaned, as explained under caption of "Molds."

Quotation Quads

99. Quotation or hollow quads are cast in our regular space and quad molds, the 24-, 36- and 48-point molds being used.



Special quotation quad matrices, made entirely of tool steel with hardened core are necessary to cast the nine sizes we make. To cast quotations proceed as follows:

100. Put mold on machine in the usual manner; then place special matrix in matrix rod slot (the matrix holder is not used to cast quotation quads). Now loosen the nut on Matrix Lever Adjusting Screw (176), and turn screw to the left, to partly withdraw same; then pull Cam Shaft Crank (224) handle far enough toward you, to bring mold firmly against nipple plate, but not far enough to bring the choker lever cam in contact with the Choker Lever Roller. If crank is in a horizontal position, it will be about right. Next turn the matrix lever adjusting screw to the right (forward), until it comes in contact with the matrix lever stop. Do not turn this screw too tight against the stop, or it will bend the lever or the stop, but only just tight enough so type will be cast without burr on face end of body. Be sure to tighten lock-nut (140) on screw after adjustment has been made.

101. Should matrix stick in the end of quotation quad, due to the metal shrinking when it cools in the mold, it will be necessary to loosen the screw (168) in Matrix Rod Collar (167), and push collar farther along on the rod against the spring, in order to give spring more tension. A little practice will enable the operator to decide just how tight the spring should be.

102. Sometimes it is necessary to remove the mold lining stool, in order to put quotation quad matrix into position in matrix rod slot; this is easily done and requires only a minute's time.

103. When changing from quotation quads to regular spaces and quads, or letter work, or from one style matrix to another, the matrix lever screw must always be properly adjusted. Also put back collar on matrix rod to original position when not casting quotation quads.

Composite Matrices and Holders

104. To cast type from our flat electrotype (Composite style) matrices, two matrix holders and a register adjuster clamp with standards are necessary (see A, B, C, D, plate 13).

105. The holder D is used for matrices from the smallest body to fourteen-point inclusive; for all sizes above fourteen-point use holder C.



106. The figures stamped on the front, or face side, of the matrix, designate the number of points to be made up with standards and placed into the register adjuster clamp; and thus used in adjusting the upper mold-register so the mold may be adjusted to the matrix in the usual manner in order to cast the character of the proper width setwise. The figures stamped on the upper end of the back of matrix designate the number of points the character is to be cast setwise.

107. When the figures stamped on the front, or face side, of the matrix, are added to those stamped on the upper end of the back, we get thirty-six points for all sizes from the smallest to thirty-six-point inclusive, and forty-five points for all forty-two- and forty-eight-point matrices.

108. For example: A matrix, thirty-six-point or smaller, if marked $27\frac{1}{8}$ on the front, it is marked $8\frac{1}{8}$ on the upper end of the back, $27\frac{1}{8} + 8\frac{1}{8} = 36$ points, while a forty-two- or forty-eight-point matrix if marked $27\frac{1}{8}$ on the front, is marked $17\frac{1}{8}$ on the upper end of back, $27\frac{1}{8} + 17\frac{1}{8} = 45$ points.

109. The standard marked S.B. .1414 is the side bearing standard, and is approximately ten and one-quarter ($10\frac{1}{4}$) points thick; this standard must always be used in addition to the other standards selected to make up the necessary number of points to be placed in the register adjuster clamp, except when a matrix is stamped with a minus (—) sign before the figures on the front, or face side.

110. To cast type from a matrix marked $27\frac{1}{8}$ on the front, or face side, select the standards necessary to make $27\frac{1}{8}$ points, and place them, together with the side bearing standard marked S.B. .1414 into the register adjuster clamp.

111. Throw open the upper half of the mold which is fastened to the Upper Mold Block (10), loosen screw which holds the adjustable register in position and slide the register back as far as it will go.

112. Now place the register adjuster clamp, with standards in position, so the bar of the clamp will lay flat on the mold body, and the inner edge of the clamp through which the spring rod passes bears against the mold chamber end of the body, and then tighten the knurled-head screw so its point bears firmly against the outer edge of the body. This brings the standards into position on the front, or face end, of the mold.



113. Now push the register forward until it bears against the standards, and tighten the register screw down firmly, then remove the register adjuster clamp and standards.

114. With the matrix in the holder as shown in C and D, plate 13, place the holder in position on machine and adjust the mold setwise in the usual way so the upper, or adjustable, register bears against the edge of matrix when mold is closed.

115. When a matrix is stamped with a minus (—) sign before the figure on the front, or face side, the minus (—) sign designates that the figures following are to be subtracted from the side bearing standard S.B. .1414 or $10\frac{1}{4}$ points, and no S.B. .1414 standard is to be used in the register adjuster clamp.

116. For example: If a matrix for 36 points or smaller body is marked 37 on the upper end of back, designating that the character cast therefrom is to be 37 points setwise, it is marked —1 on the front; $37-1=36$. To cast from this matrix select the number of standards necessary to make up one (1) point less than the S.B. .1414 standard; $10\frac{1}{4}-1=9\frac{1}{4}$ points, therefore use $9\frac{1}{4}$ points only in the register adjuster clamp, and do not use the S.B. .1414 standard at all.

117. If a 42- or 48-point matrix is stamped —1 on the face side, it is stamped 46 on the upper end of back, designating that the character cast therefrom is to be 46 points setwise. To cast from this matrix, select the standards to make up one (1) point less than the S.B. .1414 standard, which is $10\frac{1}{4}$ points thick. $10\frac{1}{4}-1=9\frac{1}{4}$; place these $9\frac{1}{4}$ points only into the register adjuster clamp, and do not use the S.B. .1414 standard.

118. Another example: A 42- or 48-point matrix may be marked —3 on the front, or face side; it is marked 48 on the upper end of the back; the character cast from this matrix is to be 48 points setwise. The standards to be used in the register adjuster clamp, in this case, are to be 3 points thinner than the S.B. .1414 standard, which, as stated above, is approximately $10\frac{1}{4}$ points thick; $10\frac{1}{4}-3=7\frac{1}{4}$ points; use only $7\frac{1}{4}$ points in the register adjuster clamp. Bear in mind that the S.B. .1414 standard is NEVER to be used when a matrix is marked with a minus (—) sign on the face side (which occurs very rarely). And ALWAYS MUST be used when NO minus (—) sign appears on the matrix.



119. Whenever changing from one style matrix holder to another, be sure the matrix lever is adjusted as explained in two preceding sections under the captions, "Matrix Holders" and "Quotation Quads."

Leads and Slugs

120. Molds and attachment for casting leads and slugs from two points to twelve points thick, in lengths from four to twenty ems pica, are made by the Universal Type-Making Machine Company.

121. A separate mold is necessary for each thickness of leads or slugs, but any length from four to twenty picas may be cast in the same mold.

122. To use a lead or slug mold proceed as follows: Remove the regular mold-block together with the matrix bracket from the rocking plate (7). Also remove the mold opening arm (104) by taking screw (106) out of the end of opening arm; this screw holds arm in swivel joint (105). Then take out locking post screw (194) which passes through the upper end of locking post (193). Also take out stud (96) which passes through long sleeve of link for ejector (100). This allows the ejector to drop out of the way of lead and slug mold.

123. Now place the lead and slug mold-block in position on rocking plate (7) and adjust the sprue as explained under caption "Adjusting mold-block and sprue," and fasten mold-block to rocking plate in precisely the same manner as the regular mold-block is fastened.

124. Next fasten the large opening arm to swivel joint (105) with the screw (106).

125. Now adjust pressure of mold against nipple plate as explained under caption "Pressure of mold against Nipple Plate."

126. The "Hook," a flat piece of steel bent at right angle to form a square, and having a slot at the end of the long side, is next placed in position by passing the screw, "that passes horizontally through the rocking plate and the mold-block," through the slot in the hook, and fastening it against the rocking plate with a nut furnished for that purpose; the hook should be adjusted so it will pass over the upper edge of nipple plate without coming in contact therewith when the mold is in its casting position, and just far enough from



the jet end of the mold so the mold does not touch the hook when the mold is opening or closing.

127. The large opening arm must be adjusted so the finger of said arm will press firmly down on the upper mold-block when said finger is in the mold-block slot at the time mold is in its casting position as explained under the caption "Opening Arm;" the pressure of this arm is adjusted very easily by adjusting the finger at the upper end of large opening arm to give the required tension.

128. The rubber tubing for water connections must of course be attached to the brass tubing in mold-block, to insure a flow of water around the mold especially while casting the thicker slugs.

129. Finally, place in position, at the upper end of the locking post (193), the extension furnished, and adjust the screw that passes through this extension and the locking post so said screw as well as the screw that passes through the end of the locking-post extension will both press equally firm on end of mold-block; this extension should be fastened to the locking post at an angle of about 45 degrees with the front or face side of the nipple plate.

130. The various lengths of leads or slugs are cast by adjusting the liner plate, which extends forward from the face of the mold, to the required length.

131. Very little pump pressure is required to cast two- or three-point leads; the pump pressure may be increased as the thickness of leads or slugs is increased; the twelve-point slug, twenty ems long of course requires the greater pump pressure. A little experience on the part of the operator usually results in turning out very satisfactory leads and slugs.



What the Operator Should Do to Secure the Best Results with the Universal Type-Maker

- Clean the machine daily.
- Clean the pump plunger daily.
- Make any necessary repairs as soon as the need appears.
- Make any necessary adjustments at once and correctly.
- Clean the mold before putting it on machine.
- Keep all working parts clean.
- Keep the metal pot filled all the time.
- Keep the matrices clean and free from burrs.
- Keep the metal always at the proper temperature when casting.
- Always stop the motor before removing or replacing hood.
- Oil the machine daily, removing hood from stop motion so as to properly oil and clean working parts.
- Examine the motor brushes and commutator occasionally, and oil motor once a week.
- Clean the metal properly with tallow, and skim off dross whenever necessary.
- Remelt old type in a large melting pot, not in the machine metal pot, and clean thoroughly before putting it in the machine metal pot.
- When mold needs repairing, send the entire mold to the factory, as we cannot do the work properly if we have only part of the mold.
- If nipple or choker needs repairing, send both the nipple and the choker, so we can do the work properly, as the choker point must be ground into the nipple.
- The Universal Type-Maker is built very carefully and accurately, and is fully tested in actual practice before it is shipped. It is sure to cast good type when properly handled, but cannot be expected to do so under conditions of neglect or carelessness.



What the Operator Should Not Do

- Do not use poor metal.
- Do not overheat the metal.
- Do not let the machine get dirty.
- Do not have the opening arm too loose.
- Do not have the locking post too tight.
- Do not have the locking post too loose.
- Do not use steel or oilstone to clean the mold.
- Do not round the edges or corners on mold.
- Do not let metal get low in pot.
- Do not lift off the hood without first stopping motor.
- Do not get zinc mixed with your metal.
- Do not rub the face of matrix on emery cloth, stone or file.
- Do not expect to cast good type when the pump sticks.
- Do not expect good results when the choker leaks.
- Do not start the machine without trying choker point to see that it is free in point of nipple.
- Do not use old metal without first remelting and cleaning it in a large melting pot, not in the machine metal pot.
- Do not try to change nipple without first removing matrix bracket.
- Do not change matrix without properly adjusting mold to same, setwise.
- Do not loosen or tighten any screw, nor attempt to make any adjustment, unless you know why you are doing so and what the result will be.
- Do not blame the machine for your own shortcomings.

Table of Decimal Equivalents of Point System

Points	Points	Points
1 = .01384	7 = .09688	16 = .22144
2 = .02768	8 = .11072	18 = .24912
3 = .04152	9 = .12456	24 = .33216
4 = .05536	10 = .13840	30 = .41520
5 = .06920	11 = .15224	36 = .49824
5½ = .07612	12 = .16608	42 = .58128
6 = .08304	14 = .19376	48 = .66432

Height of type is .918



Ordering Supplies and Repairs

Always order repairs by name and number of the piece as given in this book. If a part of machine is sent to our factory for repairs, attach thereto a tag with the owner's name thereon as a means of identification. This is necessary in order to enable us to return the part to the person to whom it may belong.

It is absolutely necessary that the entire mold be returned to us when repairs are to be made, so that we may be enabled to examine all its parts, test its working on the machine, and assure ourselves that the mold is in first-class condition before being returned to the customer.

If either the choker or nipple need repairing, send both the nipple and choker. We cannot properly repair one without the other. It is advisable to send the nipple plate also, as we can then grind the nipple point into the nipple plate bearing.

Always order matrices by series number, as given in our specimen book.



PLATE 1

- 7-B Plate and Connections.
- 9 Bracket for Matrix Rod.
- 46 Screw (No. 8-32) Key, for Matrix Rod.
- 182 Matrix Bracket (assembled complete)
- 169 Spring for Matrix Rod.
- 67 Snake.
- 91 Rod for Snake.
- 7 Rocking Plate.
- 92 Socket, Ball, for Snake.
- 167 Collar for Matrix Rod.
- 294 Lower Mold Block.
- 181 Nut ($\frac{1}{2}$ ") for Snake Connecting Rod.
- 159 Rod for Matrix Holder.
- 108 Retainer for Snake.
- 95 Stud for Snake Connecting Rod.

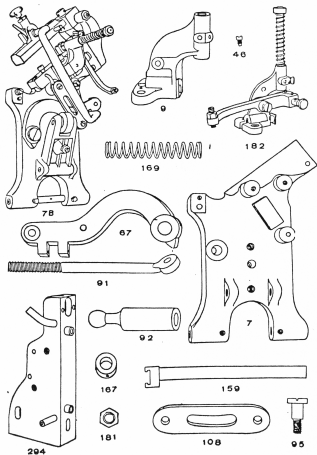




PLATE 2

- 100 Link for Ejector.
- 107 Washer for Swivel Joint.
- 104 Arm, Mold-opening.
- 101 Stud-Rivet for Ejector.
- 105 Joint, Swivel, for Opening Arm.
- 105-A Pin, Swivel, for Swivel Joint to Opening Arm.
- 96 Stud from Snake to Ejector Link.
- 340 Matrix Rest.
- 341 Spring for Matrix Rest.
- 98 Ejector.
- 99 Stud for Ejector.
- 132 Collar for Cam Shaft.
- 131 Shaft, Cam.
- 47 Cam for Choker Lever.
- 48 Cam for Rocking Plate Frog.
- 49 Cam for Locking Post Lever.
- 50 Cam for Plunger Lever.
- 224 Crank and Handle (assembled).
- 230 Screw ($\frac{1}{4}$ "), Set, for Crank.
- 228 Handle for Crank.
- 113 Flanged Pulley for Cam Shaft.

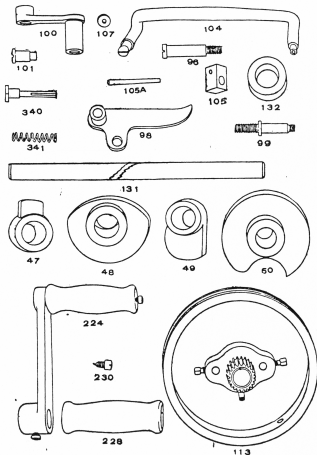




PLATE 3

- 115 Clutch.
- 110 Spring for Clutch.
- 65 Screw ($\frac{3}{8}$ "), Set-, for Choker Cam.
- 327 Bush for Cam Shaft Pinion.
- 144 Pin for Clutch.
- 352 Protector for Oil Holes.
- 114 Friction Disc.
- 125 Lever, Cam Lock, for Throwout.
- 145 Pin for Pulley.
- 40- $\frac{1}{2}$ Pin, Bearing, for Cam Roller for Choker Lever.
- 40 Pin, Bearing, for Cam Roller, No. 126 Throwout Lever.
- 20 Box, Phosphor-Bronze, for Cam Shaft.
- 64 Screw ($\frac{3}{8}$ "), Set-, for Locking Post Cam.
- 353 Protector for Oil Holes, Driving Shaft.
- 299 Pin, Bearing, for Frog Roller.
- 16 Cap, Cam Shaft Bearings.
- 11 Lever for Locking Post.
- 14 Lever to work Choker Arm.
- 21 Roller for Locking Post Lever.

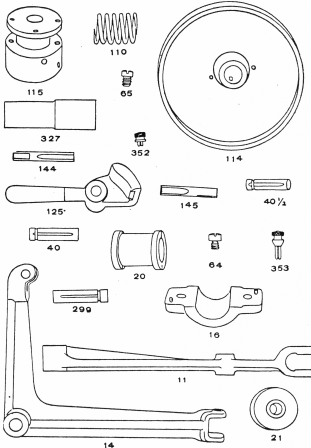




PLATE 4

- 34 Pin, Stop for Plunger Arm Pivot Bush.
- 29 Sleeve for Plunger Stem.
- 32 Pin ($3\frac{1}{8}$ "), Screw ($1\frac{1}{8}$ "), Pivot for Plunger Arm Fulcrum.
- 256 Shield, Furnace, Right.
- 257 Shield, Furnace, Left.
- 157 Spring for Shifting Lever Catch.
- 120-A Catch for Clutch Release Lever Stop.
- 120-B Spring for Clutch Release Lever.
- 88 Lever, Withdrawing, for Rocking Plate Spring.
- 13 Lever, Plunger.
- 134 Collar for Secondary Shaft.
- 258 Type Chute (assembled).
- 156 Catch for Shifting Lever.
- 154 Lever, Shifting, for Intermittent Cam.

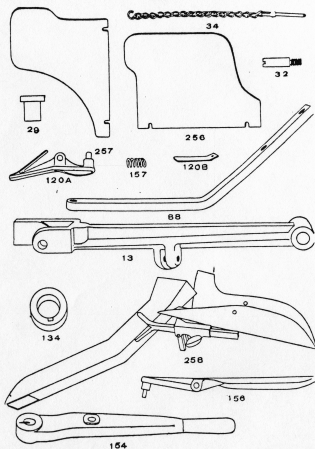




PLATE 5

- 33 Bush for Plunger Arm Pivot.
- 19 Plunger, Depressor, and Stem.
- 4 Fulcrum, Plunger Arm.
- 69 Nipple No. 1.
- 70 Choker and Point (assembled) No. 1.
- 137 U Collar for Intermittent Cam.
- 3-A Stud Pivot for Choker Arm.
- 22-A Arm for Plunger.
- 161 Screw ($\frac{1}{8}$ " x 1"), Hexagon Cap, for holding Melting Pot.
- 73 Pin, for Moving Choker.
- 1 Pot, Melting.
- 5 Furnace.
- 30 Nut ($\frac{1}{2}$ ") Knurled, for Plunger Stem.
- 285 Bracket for Thermometer.
- 66 Stud to support Nipple Plate.
- 255 Door, Fire-Box.
- 71 Plate, Nipple No. 1.
- 15-A Arm, Choker.
- 201 Staybolt for Throwout Bracket.

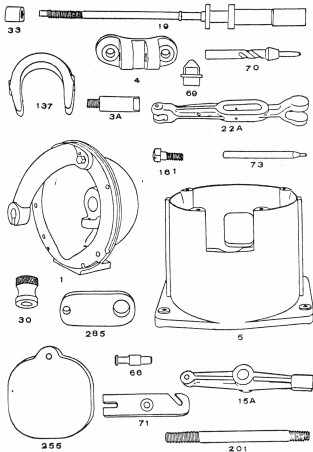




PLATE 6

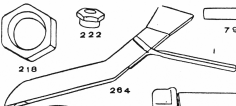
- 218 Nut, Lock-, for Socket No. 216.
- 222 Nut for Plunger Lever Spring Stem.
- 79 Latch, for Door.
- 329 Screw ($\frac{1}{4}$ "-20), Thumb-, for Adjusting Jet Chute.
- 264 Chute Jet (assembled).
- 78 Knob for Door.
- 315 Flame Spreader.
- 216 Socket for Plunger Lever Spring.
- 217 Cap for Plunger Lever Spring Socket.
- 215 Spring for Plunger Lever.
- 219 Stem for Plunger Lever Spring.
- 179 Stop for Matrix Lever.
- 77 Door, General.
- 304 Gas-Burner (assembled).
- 94-A Cap for Ball-Socket, Snake Arm.
- 307 Jet for Gas-Burner.
- 208 Spring for Choker Lever.
- 209 Screw ($\frac{3}{8}$ ") Adjusting Choker Lever Spring.



218



222



264



79



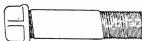
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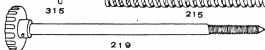


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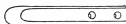
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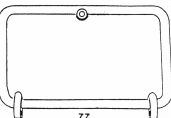
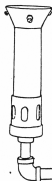
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179



77



94A

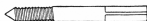
304



307



208



209



PLATE 7

- 119-A Lever, Clutch.
- 130 Retainer for Throwout.
- 143 Bush, Bearing Secondary Shaft.
- 126 Lever for Throwout.
- 138 Arm, Fork, for moving Intermittent Cam.
- 123 Roller for Clutch Lever.
- 118 Bracket for Throwout.
- 355 Pocket for Throwout Spring.
- 146 Shaft, Secondary.
- 136 Pin for Intermittent Cam.
- 135 Cam, Intermittent, to operate Throwout.
- 127 Throwout.
- 111 Gear, 132 Teeth, 16 Pitch, for Secondary Shaft.
- 153 Shaft for Fork Arm and Shifting Lever, Intermittent Cam.
- 147 Key, Spline, for Secondary Shaft.

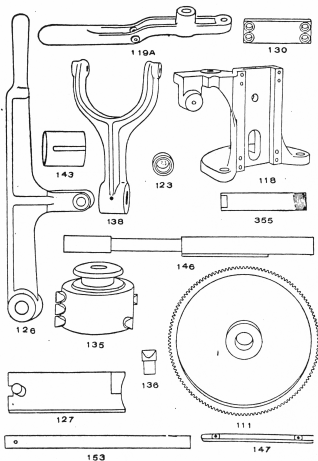
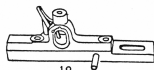




PLATE 8

- 10 Upper Mold Block.
- 184 Handle for Opening Arm Adjusting Screw.
- 189 Shoe, Detaining, for Upper Mold Block.
- 188 Nut, Lock-, for Opening Arm Adjusting Screw Handle.
- 60 Nut, Lock-, Special, for Opening Arm Adjusting Screw.
- 185 Screw for adjusting Opening Arm (In Mold Block).
- 186 Spring for Opening Arm Latch.
- 351 Screw ($\frac{1}{2}$ " for Yoke (Short).
- 8 Yoke, connecting Mold Blocks.
- 42 Box for Mold Block.
- 41-A Pin, Bearing for Yoke.
- 41-B Screw ($\frac{1}{8}$ " Set-, for Yoke Pin.
- 319 Screw ($\frac{1}{2}$ " Cap-, for Yoke (Long).
- 290 Sleeve Bearing for Yoke.
- 297 Screw ($\frac{3}{8}$ " Adjusting, for Frog.
- 45 Clamp for Mold Box.
- 59 Latch for retaining Opening Arm in Mold Block.
- 324 Dowel, Hollow, for Mold.
- 291 Screw ($\frac{1}{4}$ " for adjusting Lower Mold Block.
- 109 Shaft, Eccentric, for Rocking Plate.
- 12 Frog for Rocking Plate.
- 17 Pin, Swing, for Frog.
- 350 Stop for Frog Adjusting Screw.
- 21-A Roller for Frog.
- 171 Fork for Matrix Lever.
- 176 Screw ($\frac{3}{8}$ " Adjusting, for Matrix Lever.
- 173 Spring for Matrix Lever (assembled).
- 168 Screw (No. 10-32) for Matrix Rod Collar.
- 140 Nut ($\frac{3}{8}$ " Lock-, for Matrix Lever Adjusting Screw.
- 170 Lever to hold Matrix to Mold.



10



184



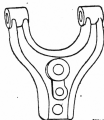
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60



8



185



186



42



418



319



41A



290



297



45



59



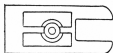
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291



109



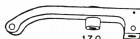
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17



350



170



21A



171



176



173



168

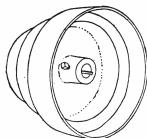


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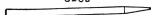


PLATE 9

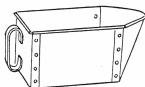
- 320-B Cone, Three-Step ($6'' \times 7\frac{1}{2}'' \times 9''$).
212 Nut ($\frac{3}{4}''$), Standard, Finished, for Rod connecting Plunger Arm.
242 Stud-Gear (assembled).
234 Key, Woodruff, for Driving Shaft.
3 Screw (No. 10-32), for Fire Door.
202 Bumper for Clutch Lever.
347 Punch for Nipple Plate.
204 Spring for Throwout.
116 Roller for Clutch.
52 Screw ($\frac{1}{2}''$), Center, for Eccentric Shaft.
41 Screw ($\frac{1}{2}''$), Center, for Eccentric Shaft.
268 Pan, Jet.
57 Stop Collar for Locking Post Spring.
89 Screw ($\frac{1}{4}'' \times 1''$), Cap-, for Withdrawing Lever.
43 Screw ($\frac{1}{4}''$), Clamping, for Mold Box.
39 Stud for Choker Lever.
44 Screw (No. 10-32), Set-, for Bush for Intermittent Cam Shaft
68 Stud for Snake.
86 Screw ($\frac{3}{8}''$), Hook, for Spring No. 85, Withdrawing.
193 Locking Post.
23 Rod connecting Plunger Arm.
56 Rod for cleaning.
320-A Bracket for Belt Drive.
31 Spring for Plunger Stem.



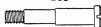
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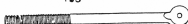
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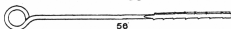
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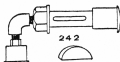
58



212



3



242



234



202



31



204



116



52



57



41



89



43



68



44



320A



PLATE 10

- 236 Gear for Driving Shaft, 128 Teeth, 16 Pitch.
- 233 Pulley for Driving Shaft.
- 358 Nut, Lock-, for Pocket for Throwout Spring.
- 293 Washer for No. 292 (Screw).
- 211 Spring for Locking Post.
- 302 Screw ($\frac{1}{4}$ ") Adjusting Choker Lever.
- 261 Screw ($\frac{1}{4}$ "), Holding, for Matrix Bracket.
- 81 Hinge (assembled).
- 301 Screw ($\frac{3}{8}$ "), Set-, Eccentric Shaft.
- 262 Screw (No. 8-32), Clamp, for Type Chute (assembled).
- 270 Stand for Type Box (assembled).
- 252 Key for Motor Pinion.
- 250 Grease Cup.
- 292-A Screw for holding Lower Mold Block to Rocking Plate.
- 269 Type Box.
- 36 Stud for Plunger Lever and Locking Post Lever.
- 162 Screw ($\frac{3}{8}$ " x 1"), Hexagon Cap-, holding Furnace.
- 61 Screw, Set (No. 14-20) Locknut Plunger Spring Socket.
- 235 Collar for Driving Shaft.
- 24 Socket connecting Plunger Lever.
- 139 Screw ($\frac{3}{8}$ ") connecting Fork Arm to U Collar.
- 117 Stud for Clutch Roller.
- 175 Head for Matrix Fork.
- 345 Wrench, Nipple.
- 195 Lock-Nut ($\frac{1}{4}$ ") for Locking Post Adjusting Screw.
- 106 Screw for retaining Opening Arm to Joint.

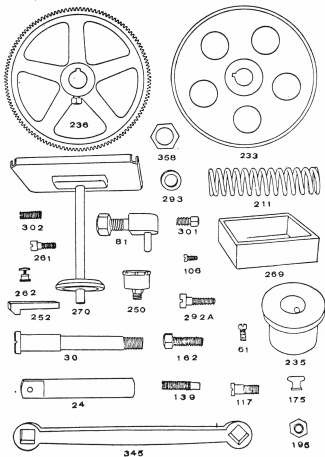




PLATE 11

- 328 Pinion for Cam Shaft Pulley. (assembled).
- 295 Screw ($\frac{1}{4}$ ") holding Lower Mold to Block.
- 207 Screw, Set-, (headless), for Clutch Roller Stud.
- 357 Stop Disc for Throwout Spring.
- 356 Screw, Adjusting, for Throwout Spring Pocket.
- 18 Screw (No. 10-32) for Choker Arm.
- 141 Pin, Bearing, for Throwout Lever.
- 38 Nut ($\frac{3}{8}$ ") for Stud.
- 238 Gears, Intermediate (assembled).
- 124 Stud for Clutch Lever Roller.
- 148 Brake (assembled).
- 232 Bush-Bearing for Driving Shaft.
- 87 Nut ($\frac{3}{8}$ ") for Hook Screw No. 86 (Wing nut).
- 133 Stud for Cam Lock Lever.
- 205 Nut ($\frac{1}{4}$ ") for Throwout Spring Pocket Adjusting Screw.
- 122 Stud for Clutch Lever.
- 194 Screw ($\frac{1}{4}$ "), Adjusting, for Locking Post.
- 197 Stud ($\frac{1}{4}$ "), Split, for Locking Post.
- 198 Ball for Split Stud.
- 35 Pin for Plunger Lever Socket.
- 336 Screw ($\frac{1}{4}$ ") for holding Upper Mold to Block.
- 292 Screw ($\frac{1}{4}$ ") holding Lower Mold Block to Rocking Plate.
- 37 Bush for Stud, Plunger Lever and Locking Post Lever.
- 165 Screw ($\frac{3}{4}$ "), Set-, (headless), for Collar for Intermittent Cam Shaft.
- 128 Pin Stud for Throwout.
- 177 Screw (No. 8-32) for holding Spring to Matrix Lever.
- 178 Stud for Matrix Lever.
- 163 Screw ($\frac{3}{8}$ " x $\frac{1}{8}$ ") Hexagon Cap-, for Choker Arm Fulcrum.
- 85 Spring for withdrawing Rocking Plate.
- 300 Hood protecting Gears, Cams, etc.
- 251 Pinion, Bronze, for Motor.
- 160 Adjuster, Brake.
- 231 Shaft, Driving.
- 346 Pin Wrench, for Clamping Screw.



328



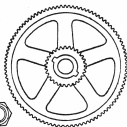
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357



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356



18



141



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238

124



232



148



87



133



205



122



194



197



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338



292



37



165



128



178



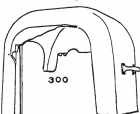
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177



163



300



261



160



231



346



PLATE 12

- S-1 Thermometer.
- S-2 Metal Strainer.
- S-3 Ladle.
- S-4 Oil Can.
- S-5 Metal Pan.
- S-6 Brush.
- S-7 Pliers.
- S-8 Nipple Driver.
- S-9 Nipple Grinder.
- S-10 Nipple-Plate Reamer.
- S-11 Small Wrench.
- S-12 Small Medium Wrench.
- S-13 Large Medium Wrench.
- S-14 Large Wrench.
- S-15 Large Screw-Driver.
- S-16 Medium Screw-Driver.
- S-17 Small Screw-Driver.

NUERNBERGER **-RETTIG**

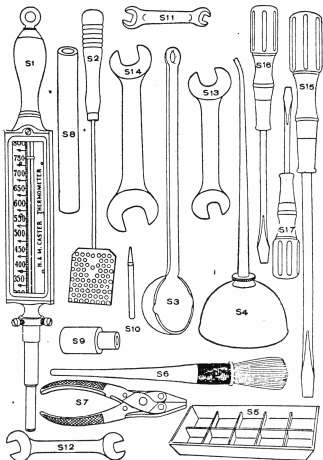
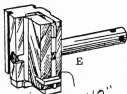
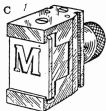
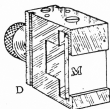
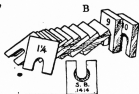
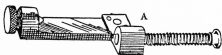


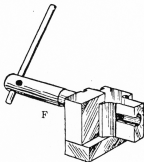


PLATE 13

- A Compositype Register Clamp.
- B Compositype Standards.
- C Compositype Matrix Holder (Lg.) 18-36 Pt.
- D Compositype Matrix Holder (Sm.) 6-14 Pt.
- E Linotype Matrix Holder.
- F Nuernberger-Rettig Matrix Holder.



.222" .110"





Numbers and Names of Parts of the Type-Maker

The respective parts are numbered from 1 to 358, but some of these numbers are not in use at present.

The numbers are arranged below in numerical order; the name of the part is opposite its corresponding number.

An illustration of each part is shown in the plates which precede (pages 33 to 57). The number of the plate wherein a part appears is printed below in the second column.

For example: Part No. 169 is the spring for the matrix rod. Plate No. 1 (page 33) shows an illustration of this part, and a corresponding number is printed under such illustration of the part on that page.

No. of Part	No. of Plate	Name of the Part	No. of Part	No. of Plate	Name of the Part
1	5	Pot, melting.	34	4	Pin, stop for plunger arm pivot bush.
3	9	Screw (No. 10-32) for fire door.	35	11	Pin for plunger lever socket.
-A	5	Stud pivot for choker arm.	36	10	Stud for plunger lever and locking post lever.
4	5	Fulcrum, plunger arm.	37	11	Bush for stud, plunger lever and locking post lever.
5	5	Furnace.	38	11	Nut ($\frac{3}{8}$ "), for stud.
7	1	Rocking plate.	39	9	Stud for choker lever.
-B	1	Plate and connections.	40	3	Pin, bearing, for cam roller, No. 126 throwout lever.
8	8	Yoke, connecting mold blocks.	40½	3	Pin, bearing, for cam roller for choker lever.
9	1	Bracket for matrix rod.	41	9	Screw ($\frac{1}{2}$ "), center, for eccentric shaft.
10	8	Upper mold block.	-A	8	Pin, bearing for yoke.
11	3	Lever for locking post.	-B	8	Screw ($\frac{5}{16}$ "), set-, for yoke pin.
12	8	Frog for rocking plate.	42	8	Box for mold block.
13	4	Lever, plunger.	43	9	Screw ($\frac{1}{2}$ "), clamping, for mold box.
14	3	Lever to work choker arm.	44	9	Screw (No. 10-32), set-, for bush for intermittent cam shaft.
15A	5	Arm, choker.	45	8	Clamp for mold box.
16	3	Cap, cam shaft bearings.	46	1	Screw (No. 8-32) key, for matrix rod.
17	8	Pin, swing, for frog.	47	2	Cam for choker lever.
18	11	Screw (No. 10-32) for choker arm.	48	2	Cam for rocking plate frog.
19	5	Plunger, depressor, and stem.	49	2	Cam for locking post lever.
20	3	Box, phosphor-bronze, for cam shaft.	50	2	Cam for plunger lever.
21	3	Roller for locking post lever.	52	9	Screw ($\frac{1}{2}$ "), center, for eccentric shaft.
-A	8	Roller for frog.	56	9	Rod for cleaning.
22A	5	Arm for plunger.	57	9	Stop collar for locking post spring.
23	9	Rod connecting plunger arm.			
24	10	Socket connecting plunger lever.			
29	4	Sleeve for plunger stem.			
30	5	Nut ($\frac{3}{8}$ "), knurled, for plunger stem.			
31	9	Spring for plunger stem.			
32	4	Pin ($\frac{3}{8}$ "), screw ($\frac{1}{4}$ ") pivot for plunger arm fulcrum.			
33	5	Bush for plunger arm pivot.			



No. of Part	No. of Plate	Name of the Part	No. of Part	No. of Plate	Name of the Part
59	8	Latch for retaining opening arm in mold block.	116	9	Roller for clutch.
60	8	Nut, lock-, special, for opening arm adjusting screw.	117	10	Stud for clutch roller.
61	10	Screw, set (No. 14-20) locknut plunger spring socket.	118	7	Bracket for throwout.
64	3	Screw ($\frac{3}{8}$ "), set-, for locking post cam.	119A	7	Lever, clutch.
65	3	Screw ($\frac{3}{8}$ "), set-, for choker cam.	120A	4	Catch for clutch release lever stop.
66	5	Stud to support nipple plate.	120B	4	Spring for clutch release lever.
67	1	Snake.	122	11	Stud for clutch lever.
68	9	Stud for snake.	123	7	Roller for clutch lever.
69	5	Nipple No. 1.	124	11	Stud for clutch lever roller.
70	5	Choker and point (assembled) No. 1.	125	3	Lever, cam lock, for throwout.
71	5	Plate, nipple No. 1.	126	7	Lever for throwout.
73	5	Pin, for moving choker.	127	7	Throwout.
77	6	Door, general.	128	11	Pin stud for throwout.
78	6	Knob for door.	130	7	Retainer for throwout.
79	6	Latch, for door.	131	2	Shaft, cam.
81	10	Hinge (assembled).	132	2	Collar for cam shaft.
85	11	Spring for withdrawing rocking plate.	133	11	Stud for cam lock lever.
86	9	Screw ($\frac{3}{8}$ "), hook, for spring No. 85, withdrawing.	134	4	Collar for secondary shaft.
87	11	Nut ($\frac{3}{8}$ ") for hook screw No. 86 (wing nut).	135	7	Cam, intermittent to operate throwout.
88	4	Lever, withdrawing, for rocking plate spring.	136	7	Pin for intermittent cam.
89	9	Screw ($\frac{3}{8}$ " x 1"), cap-, for withdrawing lever.	137	5	U collar for intermittent cam.
91	1	Rod for snake.	138	7	Arm, fork, for moving intermittent cam.
92	1	Socket, ball, for snake.	139	10	Screw ($\frac{3}{8}$ "), connecting fork arm to U collar.
94A	6	Cap for ball-socket, snake arm.	140	8	Nut ($\frac{3}{8}$ "), lock-, for matrix lever adjusting screw.
95	1	Stud for snake connecting rod.	141	11	Pin, bearing for throwout lever.
96	2	Stud from snake to ejector link.	143	7	Bush, bearing secondary shaft.
98	2	Ejector.	144	3	Pin for clutch.
99	2	Stud for ejector.	145	3	Pin for pulley.
100	2	Link for ejector.	146	7	Shaft, secondary.
101	2	Stud-rivet for ejector.	147	7	Key, spline, for secondary shaft.
104	2	Arm, mold-opening.	148	11	Brake (assembled).
105	2	Joint, swivel, for opening arm.	153	7	Shaft for fork arm and shifting lever, intermittent cam.
—A	2	Pin, swivel, for swivel joint to opening arm.	154	4	Lever, shifting, for intermittent cam.
106	10	Screw for retaining opening arm to joint.	156	4	Catch for shifting lever.
107	2	Washer for swivel joint.	157	4	Spring for shifting lever catch.
108	1	Retainer for snake.	159	1	Rod for matrix holder.
109	8	Shaft, eccentric, for rocking plate.	160	11	Adjuster, brake.
110	3	Spring for clutch.	161	5	Screw ($\frac{1}{4}$ " x 1"), hexagon cap, for holding melting pot.
111	7	Gear, 132 teeth, 16 pitch, for secondary shaft.	162	10	Screw ($\frac{3}{8}$ " x 1"), hexagon cap-, holding furnace.
113	2	Planged pulley for cam shaft.	163	11	Screw ($\frac{3}{8}$ " x $\frac{3}{8}$ "), hexagon cap-, for choker arm fulcrum.
114	3	Friction disc.	165	11	Screw ($\frac{3}{4}$ "), set-, headless, for collar for intermittent cam shaft.
115	3	Clutch.	167	1	Collar for matrix rod.
			168	8	Screw (No. 10-32) for matrix rod collar.
			169	1	Spring for matrix rod.



No. of Part	No. of Plate	Name of the Part	No. of Part	No. of Plate	Name of the Part
170	8	Lever to hold matrix to mold.	233	10	Pulley for driving shaft.
171	8	Fork for matrix lever.	234	9	Key, Woodruff, for driving shaft.
173	8	Spring for matrix lever (assembled).	235	10	Collar for driving shaft.
175	10	Head for matrix fork.	236	10	Gear for driving shaft, 128 teeth, 16 pitch.
176	8	Screw ($\frac{3}{4}$ "), adjusting, for matrix lever.	238	11	Gears, intermediate (assembled).
177	11	Screw (No. 8-32) for holding spring to matrix lever.	242	9	Stud-gear (assembled).
178	11	Stud for matrix lever.	250	10	Grease cup.
179	6	Stop for matrix lever.	251	11	Pinion, bronze, for motor.
181	1	Nut ($\frac{3}{4}$ ") for snake connecting rod.	252	10	Key for motor pinion.
182	1	Matrix bracket (assembled complete).	255	5	Door, fire-box.
184	8	Handle for opening arm adjusting screw.	256	4	Shield, furnace, right.
185	8	Screw for adjusting opening arm (in mold block).	257	4	Shield, furnace, left.
186	8	Spring for opening arm latch.	258	4	Type chute (assembled).
188	8	Nut, lock-, for opening arm adjusting screw handle.	261	10	Screw ($\frac{1}{4}$ "), holding, for matrix bracket.
189	8	Shoe, detaining, for upper mold block.	262	10	Screw (No. 8-32), clamp, for type chute (assembled).
193	9	Locking post.	264	6	Chute jet (assembled).
194	11	Screw ($\frac{1}{4}$ "), adjusting, for locking post.	268	9	Pan, jet.
195	10	Lock-nut ($\frac{1}{4}$ ") for locking post adjusting screw.	269	10	Type box.
197	11	Stud ($\frac{1}{4}$ "), split, for locking post.	270	10	Stand for type box (assembled).
198	11	Ball for split stud.	285	5	Bracket for thermometer.
201	5	Straybolt for throwout bracket.	290	8	Sleeve bearing for yoke.
202	9	Bumper for clutch lever.	291	8	Screw ($\frac{1}{4}$ ") for adjusting lower mold block.
204	9	Spring for throwout.	292	11	Screw ($\frac{1}{4}$ ") holding lower mold block to rocking plate.
205	11	Nut ($\frac{1}{4}$ ") for throwout spring pocket adjusting screw.	—A	10	Screw for holding lower mold block to rocking plate.
207	11	Screw, set-, (headless), for clutch roller stud.	293	10	Washer for No. 292 (screw)
208	6	Spring for choker lever.	294	1	Lower mold block.
209	6	Screw ($\frac{3}{4}$ "), adjusting choker lever spring.	295	11	Screw ($\frac{1}{4}$ ") holding lower mold to block.
211	10	Spring for locking post.	297	8	Screw ($\frac{3}{4}$ "), adjusting, for frog.
212	9	Nut ($\frac{1}{4}$ "), standard, finished, for rod connecting plunger arm.	299	3	Pin, bearing, for frog roller.
215	6	Spring for plunger lever.	300	11	Hood protecting gears, cams, etc.
216	6	Socket for plunger lever spring.	301	10	Screw ($\frac{3}{4}$ "), set, eccentric shaft.
217	6	Cap for plunger lever spring socket.	302	10	Screw ($\frac{1}{4}$ ") adjusting choker lever.
218	6	Nut, lock-, for socket No. 216.	304	6	Gas-burner (assembled).
219	6	Stem for plunger lever spring.	307	6	Jet, burner.
222	6	Nut for plunger lever spring stem.	315	6	Flame spreader.
224	2	Crank and handle (assembled).	319	8	Screw ($\frac{1}{4}$ "), cap-, for yoke (long).
228	2	Handle for crank.	320A	9	Bracket for belt drive.
230	2	Screw ($\frac{1}{4}$ "), set, for crank.	320B	9	Cone, 3-step ($6^{\circ} \times 7\frac{1}{4}^{\circ} \times 9^{\circ}$).
231	11	Shaft, driving.	324	8	Dowel, hollow, for mold.
232	11	Bush-bearing for driving shaft.	327	3	Bush for cam shaft pinion.
			328	11	Pinion for cam shaft pulley (assembled).
			329	6	Screw ($\frac{1}{4}$ " -20), thumb-, for adjusting jet chute.
			336	11	Screw ($\frac{1}{4}$ ") for holding upper mold to block.



No. of Part	No. of Piece	Name of the Part	No. of Part	No. of Piece	Name of the Part
340	2	Matrix rest.	353	3	Protector for oil holes, driving shaft.
341	2	Spring for matrix rest.	355	7	Pocket for throwout spring.
345	10	Wrench, nipple.	356	11	Screw, adjusting, for throwout spring pocket.
346	11	Pin wrench for clamping screw.	357	11	Stop disc for throwout spring.
347	9	Punch for nipple plate.	358	10	Nut, lock-, for pocket for throwout spring.
350	8	Stop for frog adjusting screw.			
351	8	Screw ($\frac{3}{8}$ " for yoke (short).			
352	3	Protector for oil holes.			

ARTICLES FURNISHED WITH THE TYPE-MAKING MACHINE

S-1	12	Thermometer.	S-10	12	Nipple-plate reamer.
S-2	12	Metal strainer.	S-11	12	Small wrench.
S-3	12	Ladle.	S-12	12	Small medium wrench.
S-4	12	Oil can.	S-13	12	Large medium wrench.
S-5	12	Metal pan.	S-14	12	Large wrench.
S-6	12	Brush.	S-15	12	Large screw-driver.
S-7	12	Pliers.	S-16	12	Medium screw-driver.
S-8	12	Nipple driver.	S-17	12	Large screw-driver.
S-9	12	Nipple grinder.			